

Reply: The AHEAD score in acute myocardial infarction: a call for more rigorous validation



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We would like to thank Vrandecic et al¹ for their great interest in our recent publication in AsiaIntervention². Our paper highlights the utility of the AHEAD score, originally developed for heart failure patients, for predicting in-hospital mortality in patients with acute myocardial infarction (MI)^{3,4}. Our study further confirmed its prognostic value for 1-year all-cause mortality, even among those without overt heart failure. This simple bedside tool enables early risk stratification at the time of admission, facilitates clinical decision-making, and can be readily integrated into routine workflows and electronic health records. By enhancing early prognostic evaluation, the AHEAD score supports personalised care strategies, communication with families, and appropriate allocation of healthcare resources. We would like to address the issues raised in their letter.

First, regarding the measurement of creatine kinase (CK), we acknowledge that blood-sampling schedules were determined by local hospital practices. However, the Japan Acute Myocardial Infarction Registry (JAMIR) participating centres are predominantly cardiovascular specialist institutions, and CK levels are routinely assessed every 3-6 hours in the majority of hospitals. Therefore, substantial systematic bias in peak CK measurements is unlikely, which is consistent with the low in-hospital mortality observed in similar nationwide registries⁵. Furthermore, previous studies have suggested that infarct size is more accurately reflected by the total biomarker release over time rather than by a single peak CK value⁶. Although our registry did not include the detailed time-concentration profiles required to perform kinetic modelling, such refined assessments may further

clarify the relationship between infarct size and outcomes in future studies. Patients without peak CK data were excluded to minimise measurement bias in this study.

Second, as noted, our analysis was a predefined substudy of the JAMIR and was not designed to perform head-to-head comparisons with established risk prediction models such as the Global Registry of Acute Coronary Events (GRACE) or Thrombolysis in Myocardial Infarction (TIMI) scores⁷. While such comparisons would indeed be informative, they were outside the scope of our investigation⁸. Importantly, the AHEAD score is intended as a simple bedside tool and does not aim to replace existing models; instead, it may serve as a complementary marker that can be applied immediately at presentation. Future prospective studies comparing the AHEAD score with established models are warranted.

Third, we agree that patients with the highest AHEAD scores were less likely to receive evidence-based therapies, which may contribute to worse outcomes. As shown in Table 1 of our paper², these patients had a higher prevalence of diabetes, severe renal dysfunction, and prior stroke, and, despite being younger, they may have had a higher burden of frailty not captured in our dataset. Such conditions could understandably lead clinicians to avoid invasive procedures, including transcatheter therapies. Indeed, a door-to-balloon time <90 minutes was an independent predictor of in-hospital mortality, supporting the notion that conservative management may influence outcomes. Nevertheless, in sensitivity analyses adjusting for treatment-related variables (Table 2, Table 3)², the AHEAD score remained independently associated with 1-year all-cause mortality, underscoring its robustness as

a prognostic indicator. Finally, based on previous reports, healthcare disparities related to social or structural factors are relatively limited in our country⁹.

We appreciate the insightful comments provided by Vrandecic et al, which will help refine future research regarding this important topic.

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Conflict of interest statement

The author has no conflicts of interest to declare.

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